3) claims 4-6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bohaty in view of Hed (US 5,300,487); and

4) claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Bohaty in view of Hed, and further in view of Wang (US 6,106,948).

Reconsideration of claims 1-10 is respectfully requested.

Rejections under 35 U.S.C. 103(a)

The Office Action asserted that "Bohaty teaches a nonlinear optical material comprising bismuth film (col. 4 lines 55-56) caopable of producing nonlinear effects (col. 4 lines 46-47)." Applicant respectfully disagrees with the Examiner's interpretation of Bohaty. In fact, Bohaty fails to teach or suggest a metallic bismuth film.

This invention is directed to a non-linear optical material that comprises a bismuth film. Claim 1 reads as follows:

1. A non-linear optical material comprising a bismuth film capable of producing non-linear optical effects including non-linear refraction and non-linear absorption.

Bohaty (the primary reference cited in the Office Action) fails to teach or suggest using a *bismuth* film as a non-linear optical material. Rather, Bohaty discloses using BIBO and MBIBO in crystalline form as non-linear optical materials (col. 4, lines 46-47 and 55-56), while BIBO and MBIBO both are *bismuth borates*, and are defined as BiB_3O_6 and $Bi_{1-x}M_xB_3O_6$, respectively (col. 2, lines 35-36). Bismuth borates are surely different from metallic bismuth, the bismuth element in the former is present as a cation. Bohaty specifically teaches that the crystals of BIBO or MBIBO are grown from molten mixture of stoichiometric composition of Bi2O3 and H3BO3. Col. 2, lines 55-60. In the present invention as defined in claim 1, the non-linear optical material

comprises a bismuth film, which is a metallic bismuth, not a bismuth borates film. Bohaty clearly does not teach or suggest a bismuth film.

For at least the reasons mentioned above, Applicants respectfully submit that claim 1 and its dependent claims 3, 7-8 and 10 patently define over Bohaty.

Regarding claim 2, the Office Action cited Takenaka, in combination with Bohaty, to teach the use of pulse-laser deposition of superconductor oxides on a substrate. Applicant respectfully submits that the proposed combination is improper for the reasons set forth below. Bohaty specifically teaches BIBO or MBIBO is in the form of single crystal and is grown from a molten mixture of stoichiometric composition of Bi2O3 and H3BO3. Col. 2, lines 55-60, Col. 4, lines 6-9. There is no suggestion to grow Bohaty's BIBO or MBIBO with Takenaka's pulse-laser deposition method. There is no reasonable expectation that Takenaka's method would produce the crystalline BIBO or MBIBO of Bohaty. Thus, the combination is improper. Further, even if Bohaty and Takenaka were combined as proposed, the combination would still fail to the bismuth film of the present invention, because neither Bohaty nor Takenaka teaches or suggests a bismuth film.

Therefore, claim 2 is patentable over Bohaty and Takenaka.

Regarding claims 4-6, the Office Action cited Hed to teach "the addition of a transparent top protective layer to cover the bismuth layer (col. 6 lines 30-31)". However, Hed does not teach or suggest a protective layer to cover a bismuth layer because Hed does not teach a bismuth layer. Clearly, Hed cannot cure the deficiencies of Bohaty. Thus, claims 4-6 are patentable over Bohaty and Hed.

Regarding claim 9, the Office Action further cited Wang to teach the use of a quartz base in a nonlinear optical structure. However, Wang cannot cure the deficiencies of Bohaty and Hed. Therefore, claim 9 is patentable over Bohaty, Hed, and Wang.

CONCLUSION

For at least the forgoing reasons, it is believed that all pending claims 1-10 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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